

FIGHT'S ON!

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Continuous Training For Tomorrow's Airmen

At the 2009 InterService/Industry Training Simulation and Education Conference, the Warfighter Readiness Research Division of the 711th Human Performance Wing, Human Effectiveness Directorate (711 HPW/RHA), is showcasing work that is being done through Cooperative Research and Development Agreements. The 711 HPW/RHA is demonstrating four innovative technologies accomplished with collaborative partners:

1. Examples of two rapidly integrated and interoperable game-based environments for military training and simulation. This research development of an interactive gateway by means of interface controls and exchanges permits game-based environments to interoperate with one another and with Live, Virtual, and Constructive environments and players in a seamless manner.
2. A Predictive Performance Optimizer technology for predicting appropriate refresher training intervals for complex task training.
3. A video of our successfully transitioned Standard Space Trainer (SST) technology.
4. A high-fidelity motion cueing technology combined with our deployable tactical trainer in the ACME Worldwide booth.

The capabilities we are showcasing this year were integrated in less than three months to test our rapid development and prototyping process.

First, we are demonstrating a new training capability composed of a heretofore standalone environment called the Distributed Dynamic Decision-making (DDD®) Synthetic Task Environment running a humanitarian rescue and support task, interoperating with an integrated Remotely Piloted Aircraft (RPA) simulation, and a constructive entity environment called BlueBox HD™.

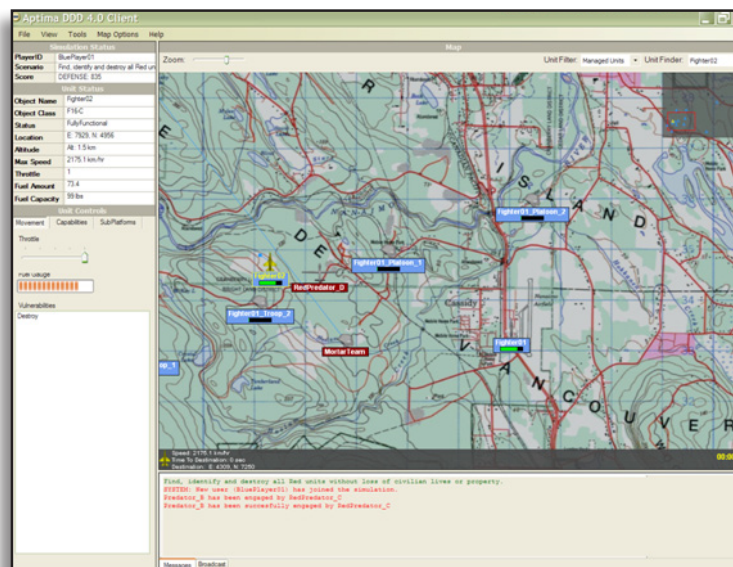
DDD® from Aptima, Inc. represents a new generation of flexible, versatile simulation environment - blending human-in-the-loop approaches (virtual), with algorithm and agent-based modes (constructive). The result of a 20+ years research program on human behavioral modeling, DDD®'s development was funded in part by several government agencies, including the National Science Foundation, Air Force

plex living world via HD World™ capabilities. These capabilities support mission monitoring features, performance assessment, and rich instructional capabilities with total scenario and exercise control. BlueBox HD™ works with standard internet protocols that support real-time transactional services for integrating instructional training solutions with synthetic avatars and voice recognition/voice synthesis. BlueBox

HD™ features multimedia content management, live monitoring, instructor control, role-player interactions, and After Action Review capabilities. HD World™ supports a Service Oriented Architecture creating a flexible 'future-proof' information technology architecture.

CHI Systems Inc. and 711 HPW/RHA recently developed and demonstrated an advanced training technology that allows student pilots to practice radio communications using a simulated pattern environment, artificial intelligent agents, and speech interaction. This technology was developed in collaboration with Air Education and Training Command. The technol-

ogy, called the Virtual Interactive Pattern Environment and Radiocomms Simulator, employs cognitive agents and speech interaction in concert with desktop simulation to provide pattern-in-a-box practice tools. The cognitive agent technology is now being employed in an innovative research collaboration to demonstrate interactive, on-demand practice opportunities for Joint Terminal Attack Controllers (JTACs) to learn effective coordination with RPA crews (and potentially vice versa). Imaging objective areas of interest, in coordination with RPA operators, is a skill that JTACs are seldom able to practice. By integrating advanced cognitive agent technology with the Joint Technology Center/Systems Integration Laboratory's Air Force Synthetic Environment for Reconnaissance and



DDD® v.1 user configurable desktop simulator.

Research Laboratory, the Army Research Institute, Office of Naval Research, and the National Aeronautics and Space Administration. Coupled with Aptima's Visual Scenario Generator 4.0, it is easy to rapidly create and customize scenarios in DDD®. Users with modest PC experience can now create complex team scenarios for a broad range of domains. The Visual Scenario Generator guides both the novice and expert scenario developers through the necessary steps to build everything from simple to the most complex scenarios for training and research.

The BlueBox HD™ Training System, developed by L-3 Communications - Link Simulation & Training, is a comprehensive operation and training environment that provides total immersion in a realistic com-

Surveillance/Multiple Unified Simulation Environment RPA simulation this collaboration will demonstrate on-demand opportunities for JTACs to practice real-time mission skills focusing on spoken and text interaction with RPA operators who are, in this case, voice enabled software agents.

Second, we will also display a hands-on demonstration of the Predictive Performance Optimizer (PPO). The PPO provides teachers, trainers, and learners of all types with a new generation of adaptive training assistance, which seeks to capture and dynamically assess performance effectiveness, accurately predict future performance, and prescribe the scheduling of training events to enhance learning stability and maximize retention. This innovative new cognitive technology was developed through collaboration between researchers from 711 HPW/RHA, L-3 Communications, and AGS TechNet. The software functions according to an underlying mathematical model, matured and made more robust through careful validation across a variety of domains and contexts. This validation scales from laboratory experimental data available in the psychological literature to ever more complex and militarily relevant team and pilot data measured in the Distributed Missions Operations testbed. PPO allows users to immediately and dynamically assess how well projected training and rehearsal regimens will meet performance effectiveness goals, stay within projected training budgets, and allow for maximum learning stability at distant points in time.

Third, a multimedia presentation of a game-based approach to space training called the Standard Space Trainer or SST will be demonstrated. The SST grew out of a very successful Small Business Innovation Research effort with Sonalysts, Inc. to develop an Integrated Satellite Operations Trainer. The SST is sponsored by HQ Air Force Space Command, Space and Missile Systems Center and HQ Air Education and Training Command, 533rd Training Squadron, Vandenberg AFB, CA. The SST is used to support independent and unit qualification training and crew training. The SST can support the fundamental behaviors of common military satellites,



Standard Space Trainer Proof-of-Concept Interface.
Photo Courtesy of Sonalysts, Inc.

sub-systems common to all satellites, space flight, orbital mechanics, and satellite operations. An instructor can monitor up to six students, provide targeted instruction to any student, and change values or insert faults/dynamic events during a scenario. The SST signifies a tremendous transition opportunity to provide cost-effective training technology to the Air Force in a streamlined process.

Finally, in collaboration with ACME Worldwide, one of our experimental deployable tactical trainers (XDTTs) was coupled with one of their True Q™ Dynamic Motion Seats (DMS). ACME integrated their motion seat into a XDTT with the goal of exploring several key fidelity issues of relevance for improving training effectiveness and transfer in less-than-full-fidelity simulation situations. True Q™ provides accurate motion cues to the pilot and adds inertial cues normally experienced in the operational system, but not often experienced in simulation environments. The DMS also delivers vibration and motion cues in five independent axes of control creating unprecedented realism and uses vertical motions to replicate G-forces as well as gun firing and weapons release. Our research

collaboration is exploring and quantifying potential benefits and liabilities associated with the addition of motion cueing and what potential enhancements to the training experience might be possible. This is particularly important with respect to fielding a smaller footprint, less expensive, and potentially deployable tactical trainer. The combination of 711 HPW/RHA's research expertise and established fidelity research protocols and measures and ACME's engineering and design prowess, provides for a unique and potentially important research and practical agenda. We are also very excited about follow-on applications that may include the utilization of the True Q™ technology in RPA training, evaluations in actual deployment venues, and development and validation of motion/force cueing-appropriate performance measurement tools.

By developing these permissive mechanisms, we can rapidly identify existing relevant environments that might have potential for addressing a training requirement, integrate them, and evaluate new capabilities while leaving each environment's underlying organic code unchanged. This can reduce development time and increase the training value as part of a larger and more integrated "family of complimentary trainers" learning enterprise.

711 HPW/RHA



ACME's F-16 True Q™ Dynamic Motion Seat mounted in an Experimental Deployable Tactical Trainer. Video capture footage by Bruce Liddil.

OUR PARTNERS



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